

REMARKS

In response to the Office Action mailed June 15, 2005, the Applicant respectfully requests reconsideration. To further the prosecution of this Application, the Applicant submits the above claim amendments and the following remarks. The claims as now presented are believed to be in allowable condition.

Claims 1-20 were pending in the application. Claims 1-14 were rejected and claims 15-20 were objected to. By this Amendment, claims 2, 11, and 15 have been cancelled without prejudice. Claim 1 has been amended to include the subject matter of cancelled claim 2, claim 10 has been amended to include the subject matter of cancelled claims 11 and 15, and new claim 21 has been added to the application. Accordingly, claims 1, 3-10, 12-13, and 16-21 are now pending in this application. Claims 1, 10, and 21 are independent claims and the remaining claims are dependent claims. No new matter has been added to the application as a result of the amendments and the Applicant has not raised any new issues that would require further searching and consideration.

Drawing Objections

The drawings have been objected to because of discrepancies between Figure 1 and the specification. The specification recites (on page 20, lines 9-13) a block having a reference number “100” and rake modems having a reference number “112.” Figure 1 illustrates a rake modem having the reference number “100” and a base station having the reference number “112.” The Applicant has corrected Figure 1 to switch the reference numbers of the block and the rake modem. No new matter is added to the application by this revision to Figure 1. Additionally, a Notice to the Official Draftsperson is enclosed with this Response.

Claim Objections

Claims 15-20 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Original claim 15 depended on claim 11 which in turn depended on claim 10. Accordingly, claim 10 is amended to include the features of claim 11 and allowable claim 15 to place it in a condition for allowance. Further, claim 16 is amended to depend from

claim 10. Accordingly, claim 16 and 17-20, which depend either directly or indirectly on claim 16, are also in a condition for allowance.

Claim Rejections Under 35 U.S.C. §112:

Claim 6 was rejected under 35 U.S.C. §112, first paragraph as failing to comply with the enablement requirement and claims 7-9 were rejected due to their dependency on claim 6. The Office Action contends that claim 6 contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The Applicant respectfully disagrees with this contention for the following reasons.

For example, the specification at page 49, line 9 through page 50, line 36 describes computations for the R(1)/R(-1) matrix (e.g., a cross-correlation matrix) as being represented by the square HJKM (e.g., a rectangular component) and the computations for the R(0)matrix (e.g., a cross-correlation matrix) as being represented by the triangle ABC (e.g., a triangular component). The Applicant believes that the specification, therefore, enables claim 6 and thereby meets the enablement requirement of 35 U.S.C. §112, first paragraph. However, withdrawal of the rejections of claims 6 and claims 7-9 are respectfully requested.

Claims 3, 4, 13, and 14 were rejected under 35 U.S.C. §112, first paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. The Office Action contends that claims 3, 4, 13, and 14 do not specify detection statistics. The Applicant, however, respectfully disagrees with this contention. Claims 3 and 13 recite generating detection statistics corresponding to symbols transmitted by the users and encoded in the waveforms as a function of the cross correlation matrix. Because the detection statistics are claimed as relating to symbols transmitted by the users and encoded in the waveforms as a function of the cross correlation matrix, the claims, in fact, are definite. Reconsideration of the rejection is respectfully requested.

Claim Rejections Under 35 U.S.C. §103(a):

Claim 1 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki (U.S. Patent No. 6,600,729) in view of Juan (U.S. Patent No. 6,754,805). Claims 2 and 10-13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki in view of Juan and further

in view of Elezabi et al. (U.S. Publication No. 2002/0122393). Claims 3-5 and 14 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki, Juan, Elezabi and further in view of Faruque (U.S. Patent No. 6,647,059).

As noted above, claim 1 is amended to incorporate the features of claim 2. More specifically, claim 1 now recites a method of processing spread spectrum waveforms transmitted by a plurality of users of a spread spectrum system, which includes distributing among a plurality of logic units parallel tasks each for computing a portion of a matrix indicative of cross correlations among the waveforms transmitted by the users. The method also recites partitioning computation of the cross-correlation matrix such that *a computational load associated with a task distributed to one of said logic units is substantially equal to computational load associated with another task distributed to another logic unit* and executing with the plurality of logic units the distributed tasks.

As amended claim 1 now incorporates the features of claim 2, we will below address the rejection of claim 2.

Suzuki relates to a DS-CDMA (Direct Sequence--Code Division Multiple Access) multi-user interference canceller and communication system. In Suzuki, “the signal of each user is first subjected to despreading in a correlator to be converted to a symbol rate signal, and then all of the processing of generating interference replica signal, the processing of subtracting the interference replica signal from the reception signal, etc. are performed on a symbol rate basis.” [Col. 4, lines 27-32].

Juan relates to methods and devices for performing digital signal processing operations. In Juan, digital signal processors and/or other programmable circuits are enhanced through the addition of one or more computation engines. Each of the computation engines is constructed from a plurality of computation cells. The computation cells are connected to form a sequence of cells capable of performing processing operations in parallel on received data.

Elezabi relates to decoders for use in multiple-access communication systems. Elezabi includes:

improved branch metrics for the single-user Viterbi decoders (VDs) following a two-stage subtractive IC detector with the conventional first stage for a CDMA system using long spreading sequences, such as IS-95. The invention is based on modeling the RMAI as Gaussian with time-dependent variance after conditioning on the time-varying user cross-correlations and then modifying the VD branch metrics appropriately to account for this characterization and thereby improve performance. [p. 1, paragraph 008.]

Although Suzuki relates to CDMA systems, it does not teach or suggest distributing among a plurality of logic units parallel task, each for computing a portion of a matrix indicative of cross correlations among the waveforms transmitted by the users. Moreover, Juan is related to a device for performing digital signal processing operations in parallel but provides no suggestion of “partitioning computation of the cross-correlation matrix such that a computational load associated with a task distributed to one of said logic units is substantially equal to computational load associated with another task distributed to another logic unit,” as recited in amended claim 1.

Further, Elezabi does not cure the shortcomings of Suzuki and Juan. In particular, it does not disclose “partitioning computation of the cross-correlation matrix such that a computational load associated with a task distributed to one of said logic units is substantially equal to computational load associated with another task distributed to another logic unit”. While the Office Action states that Elezabi discloses “that at the receiver, a bank of K matched filter correlators or despreaders despread each user’s signal,” it is unclear how this would suggest “partitioning computation of the cross-correlation matrix such that a computational load associated with a task distributed to one of said logic units is substantially equal to computational load associated with another task distributed to another logic unit”. In Elezabi, as the receiver receives each user’s signal, it merely despreads that signal. Elezabi does not teach or suggest partitioning computation of the signal so as to balance the computational load among a plurality of logic units. Hence, the combined teachings of Suzuki, Juan, and Elezabi fail to teach the subject matter of amended claim 1. Accordingly, claim 1 and claims 3-9, which depend upon claim 1, are believed to be in a condition for allowance.

Independent claim 10 was rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki in view of Juan and further in view of Elezabi. As noted above, the Applicant has amended claim 10 to include the features of claim 11 and allowable claim 15 to place it in a

condition for allowance. Further, claim 16 is amended to depend from claim 10. Accordingly, claim 16 and 17-20, which depend either directly or indirectly on claim 16, are also in a condition for allowance.

Newly Added Claim

Claim 21 is added. Support for this claim can be found for example on page 3, lines 19-30, and throughout the remainder of the specification. As noted above, Suzuki fails to teach “distributing among a plurality of logic units parallel tasks each for computing a portion of a matrix indicative of cross correlations among the waveforms transmitted by the users,” much less performing such distribution as a function of the number of users who transmit waveforms. Similarly, the other references fail to teach this feature, namely distributing the computation of the cross-correlation matrix among different logic units *as a function of the number of users*. Accordingly, new claim 21 is believed to be patentable over the cited references.

Conclusion

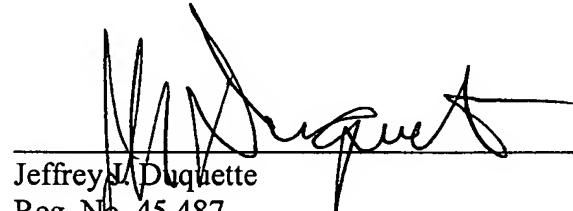
In view of the above, the Applicant respectfully submits that the claimed invention is patentable. The Applicant therefore kindly requests consideration of all claims in light of the above remarks and allowance thereof.

The Applicant hereby petitions for any extension of time which is required to maintain the pendency of this case. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 141449.

The Examiner is also kindly requested to contact the undersigned if such would expedite examination and allowance of the application.

Respectfully submitted,

NUTTER, McCLENNEN & FISH, LLP


Jeffrey J. Duquette
Reg. No. 45,487
Attorney for Applicants

Date: September 15, 2005

World Trade Center West
155 Seaport Boulevard
Boston, MA 02120-2604
Tel: (617)439-2680
Fax: (617)310-9680

1461985.1